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Doubt, Doubts, and Doubters: The Genesis of a New Research Agenda?

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7.1. INTRODUCTION

[illegible]rst contingent valuation (CV) study was conducted in the early 1960s [illegible]s, 1963), a small number of studies were conducted in the 1970s (Ham-[illegible] and Brown, 1974; Randall *et al.*, 1974; Brookshire *et al.*, 1976; Bishop [illegible]eberlein, 1979), and the 1980s and 1990s have experienced an explosion [illegible]ingent valuation studies (Carson *et al.*, 1992). Doubters have not been [illegible] in expressing their concerns about CV. Early concerns were suc-[illegible] expressed by Scott when he characterized CV with the statement 'ask [illegible]thetical question and you will get a hypothetical response' 1965: 37. [illegible] research exploring the validity and reliability of CV estimates has [illegible] through a sometimes focused and sometimes random process over [illegible] two decades, criticisms of CV have generally been sporadic, with the [illegible] doubts being rehashed over and over again. This evolution changed [illegible]atically with the Exxon Valdez oil spill in 1989. No longer was CV an [illegible]ectual curiosity of practitioners or a tool of Government economists [illegible] the results of a cost–benefit analysis would only indirectly affect a [illegible] segment of society. CV became the focal point in determining a [illegible] payment by a single, but large, corporation, Exxon. Exxon brought [illegible]ber of economists together to attack the credibility of CV, focusing on [illegible]easurement of non-use values to support their legal defence in the [illegible] resources damage litigation ensuing from the Exxon Valdez oil [illegible] The focus of the critiques was on non-use values because this com-[illegible] of value was expected to be a large portion of any monetary damage [illegible] put forward by the federal and state trustees responsible for protecting [illegible] damaged resources. After the case was settled out of court Exxon [illegible]mented its major critiques of CV estimates of non-use values in a

[illegible] senior author of this paper, Boyle, worked for Exxon as a paid consultant in the [illegible] resource damage litigation ensuing from the Exxon Valdez oil spill.

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book edited by Hausman (1993) entitled *Contingent Valuation: A Cri*... *Assessment*. Although the experiments presented in the Hausman b... focused specifically on the application of CV to the measurement of n... use values, the doubts expressed were implicitly extended, perhaps ... accidentally, to CV measurements of use values.

In response to this book, which many considered to express the ... opinions of consultants to Exxon, the United States National Oceanic ... Atmospheric Administration (NOAA) commissioned an independent 'C... tingent Valuation Panel... to evaluate the use of [contingent valuation] ... determining nonuse values' (NOAA, 1993: 4610). The NOAA Panel ... cluded that CV estimates of non-use values do 'convey useful informa... (ibid.) when their proposed guide-lines for conducting a CV study ... followed. The outcome of the Exxon-funded critique and NOAA resp... clearly sent the message that conditions for conducting CV studies ... changed. Doubters now had a solid foothold to express their doubts ... supporters of CV were forced to recognize a well-organized and -fina... attack on CV methodologies.

CV research, as a cohesive investigation, is incomplete and many ... questions remain. By focusing on these questions, rather than taking ... maturely fast and firm positions, it may be possible to facilitate a m... constructive debate. In the mean time, a healthy dose of concern is imp... ant in the application, use, and interpretation of CV. This is true for ... empirical methodology, but doubts and scepticism are not sufficie... dismiss any analytical tool. The current debate helps to focus the issu... concern in the application of CV. In the remainder of this chapte... identify what we believe are some of the more important issues facing ... applications today. Before turning to these specific issues, we attempt to ... the current debate over the validity of CV in a broader context.

7.2. A BROADER VIEW OF THE ISSUE OF CONCERN

The Hausman book is not the first assessment of the 'state of the art' of C... and the NOAA Panel's report is not the first attempt to develop guide-li... for conducting CV studies. Cummings *et al.* (1986) did the first assessmen... CV and proposed some very restrictive 'reference operating conditio... where CV was deemed to work well. The Cummings book, like the Hausma... book, was denigrated by some critics but for the opposite reason. The ... Environmental Protection Agency (EPA) provided funding for the asse... ment that led to the book and some viewed this as an attempt to deem C... good enough for government work and to avoid additional funding of co... validation studies.

Fischoff and Furby proposed conditions for a 'satisfactory (CV) tran... tion' where respondents 'are fully informed, uncoerced, and able to iden...

...wn best interests' (1988: 148). The Fischoff and Furby contribution ...e credibility because they are generally deemed to be outsiders to the ...ate. They explicitly acknowledged the hypothetical nature of CV and ...ed that 'specifying all relevant features and ensuring they have been ...ood, is essential to staging transactions. Unless a feature is specified ...ly and comprehensively, [CV respondents] ... must guess' (ibid. 179– ...ey go on to state that 'ensuring understanding is the responsibility of ...who pose the transaction' (ibid. 180). At this juncture, Fischoff and ...implicitly appear to be judging CV against an absolute criterion, ...ishing a satisfactory transaction. Two sides to this debate arise. A ...atic approach would reveal that consumers do not have full informa- ...hen making market decisions, so why should such an ideal be applied ...applications? On the other hand, consumers can choose among the ...ation when making market decisions, and we do not know what ...ation they use, so we must provide as much information as possible. ...position does not, however, recognize potential cognitive overload by ...ndents and the heuristics they may employ when answering CV ques- ...in this context.

...pite the fact that three decades have elapsed since the publication of ...article, the basic critique of CV has changed little. Hausman states in ...face to his edited book that 'CV... differs significantly from most ...ical research in economics, which is based on market data caused by ...orld decisions made by consumers and firms' (1993: vii). The basic ...still centres around the hypothetical nature of CV; money is not ...exchanged. Although revealed behaviour results in the estimation of ...allian surplus, which is not the desired Hicksian compensating or ...alent welfare measure (Mäler, 1974; Just *et al.*, 1982; Freeman, 1993), ...oubters are more confident in economic theory and econometrics to ...el Hicksian surplus than they are in individuals' statements of value. ...doubters appear readily to accept the use of economic theory to estab- ...Willig (1976) bounds or a combination of theory and econometrics to ...e exact (Hicksian) welfare measures (McKenzie and Pearce, 1976; ...sman, 1981).

...practitioners, on the other hand, have confidence that responses to ...hetical questions will approximate behaviour when money is actually ...anged, yielding acceptable estimates of Hicksian welfare. In the domain ...values a number of field and laboratory experiments lend credence to ...onfidence (Bishop *et al.*, 1983; Dickie *et al.*, 1987; Kealy *et al.*, 1988). ...comparisons of CV estimates with actual cash transactions are known ...s of criterion validity (Carmines and Zeller, 1979). No criterion ...ity studies exist to provide a comparable level of confidence in CV ...ations to the estimation of non-use values.

...damental problems exist with both the Hausman and NOAA Con- ...nt Valuation Panel positions. The Hausman book and the NOAA

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Panel report do not clearly distinguish applications of CV to meas… use values from applications to measuring non-use values. There has… much more research conducted to investigate CV applications to use va… than to non-use values (Cummings *et al.*, 1986; Mitchell and Carson, … Carson *et al.*, 1992) and, consequently, there is less controversy surrou… ing the use of CV to measure use values. People who are unfamiliar… casually familiar, with the CV debate have construed the Hausman b… and NOAA Panel report to criticize all applications of CV, not just th… to measuring non-use values. Both works, however, are concerned… potential problems associated with attempting to use CV for measu… non-use values. The issue of concern is also clouded by many CV stu… estimating total values or option prices that include both use and non… components.

Critiques in the Hausman book implicitly evaluate CV on an abso… scale where the outcome is either right or wrong, not in the context of err… involved in the application of other empirical methodologies. The NO… Panel recognized this inconsistency when they deemed CV acceptable 'by… standards that seem to be implicit in similar contexts' (1993: 4610)… example, one line of criticism follows from the fact that CV estimates… be inconsistent with what is suggested by economic theory (Desvousges … 1992; Diamond *et al.*, 1993). These inconsistencies also arise in the anal… of market data, but the conditions of economic theory (e.g., adding… homogeneity, symmetry) are often imposed on the data to ensure estim… are consistent with theory (Deaton and Muellbauer, 1980). The Haus… critique also overlooks the fact that market data are collected by some… of survey and can be subject to some of the same concerns expr… regarding CV. The NOAA Panel position on CV standards is of conc… because it proposed guide-lines that in many cases are without citation… document the recommended protocol and to place it in context with… literatures on economic welfare theory, survey research methodolog… existing valuation research, or comparable empirical analyses.

Within a research agenda, practical applications aside, objective… must be employed to evaluate the credibility of any empirical methodol… and CV is no exception. The usefulness of a methodology for pract… applications arises from the extent to which the methodology is capabl… meeting a desired theoretical construct. In CV research, this is gen… evaluated in terms of the validity and reliability of value estimates (Carm… and Zeller, 1979; Mitchell and Carson, 1989). Within this context, Fisch… and Furby proposed a conceptual framework for the conduct of CV stu… but they do not delve substantially into the context for accomplishing… proposals.

The NOAA Panel considered more of the details of accomplishing a… study of non-use values. They addressed sample type and size, minim… non-response, using personal interviews, pre-testing for interviewer eff…

…ing of sampling procedures, questionnaire pre-testing, conservative …using willingness to pay, using referendum questions, accurate com…descriptions, pre-testing photographs, reminders of substitutes, and …other issues (1993: 4611–14). Despite the prognostications of this …ed group of economists, hard questions remain. For example, CV …ations have typically employed mail surveys and the Panel did not …ss in detail why mail surveys are inappropriate and personal interviews …more appropriate. Referendum questions are simply dichotomous-…questions with the payment vehicle posed as a referendum. Consider…schoff and Furby's conceptual protocol, a referendum is not the right …ent vehicle for all social contexts, i.e. respondents may know the …ion or payment will be not be established by referendum vote. What if …nding respondents of substitutes does not affect value estimates? Does …mean that CV is fundamentally flawed because respondents do not …ider substitutes when formulating value responses, or did the investiga…pecify the wrong set of substitutes, or do respondents consider substi… without prompting? Thus, while helpful in raising questions for the CV …rch agenda, the NOAA Panel's recommendations also do not go far …gh in answering the hard questions that must be addressed when …ning a CV study.

…he ensuing discussion we focus on selected issues associated with …ing CV which appear to us to be of greatest current concern in the …re. This is done within the context of the CV literature. Issues that …CV values estimates, but are not unique to the method, such as the …of a functional form in data analyses, will not be extensively dis… The discussion is organized around value conceptualization, ques…aire design (information issues and CV methodology), and data …ysis.

7.3. VALUE CONCEPTUALIZATION

…ing the value to be estimated is a necessary prerequisite of any valua… study regardless of whether CV, some other non-market valuation …dology, or market data are to be employed. Three issues rise to the …ont in CV studies: (1) understanding option price; (2) sorting out non…ues; and (3) the relationship between estimates of willingness to pay … and willingness-to-accept compensation (WTA). Option price and …e values are interrelated because non-use values can be components of … prices. Option price and non-use values can also be measured as …WTP or WTA. Given that option price is the measure of an indi… value under conditions of uncertainty, this provides a useful start…int for the discussion. The non-use value issue, however, is simmering …elow the surface.

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7.3.1. Option Price

Let us start with a simple example where

$$V(p_{gw}, P_s, I; GW) \quad (7.$$

is an indirect utility function representing an individual's optimal cho[…] regarding consumption of groundwater; p_{gw} is the price of potable grou[…] water, P_s is a vector of prices of substitute sources of potable water, […] income, and GW is a vector of non-use arguments relating to groundwa[…] quality. All other terms are suppressed for notational convenience. Le[…] assume that there are a variety of discrete threats to the groundwa[…] resource and we wish to measure the value of reducing the probabilit[…] contamination. The appropriate measure of value is option price (Bisho[…] 1982; Smith, 1983; Freeman, 1993; Ready, 1993). Option price (op) can[…] defined by

$$\sum_i \pi_i' V(p_{gw,i}, P_s, I_i - op; GW_i) = \sum_i \pi_i V(P_{gw,i}, P_s, I_i; GW_i) \quad i = 1, \ldots$$

where π_i is the probability of alternative groundwater conditions, and […] I_i, and GW_i are indexed by i to indicate that they may be influenced by […] groundwater condition. The effects on p_{gw} and GW are obvious, while […] assumed that I (income) is net of health expenditures resulting from […] consumption of contaminated groundwater. Option price (op) in this […] ample, which assumes supply uncertainty and demand certainty, is a s[…] independent payment to reduce the probability of contamination. If π_i […] subset of probabilities associated with groundwater contamination, […] $\pi_i' \leqslant \pi_i$ for at least one i.[2]

Three issues can be developed from this simple example. The first a[…] from a recognition that option price depends critically on the chang[…] the probability of contamination. In the CV literature, practitioners […] tended to overlook probabilities in the design of CV questions and in […] analyses of CV data (Boyle and Bishop, 1987; Desvousges *et al.*, 19[…] Loomis, 1987). Some notable exceptions do exist, including studies wh[…] attempt to incorporate the role of subjective probabilities into CV su[…] design and data analyses (Smith and Desvousges, 1987; Edwards, 19[…] Loomis and duVair, 1993; Bergstrom and Dorfman, 1994). If option p[…] is to be estimated, the CV question should be framed to include both […] baseline (π_i') and alternative (π) probabilities. This information is s[…] quently utilized to analyse and interpret CV responses. This is partic[…] true for applications of dichotomous-choice questions where estim[…]

[2] Option value is not considered here because it is simply the difference between option […] and expected consumer surplus (Bishop, 1982). It is an artefact of uncertainty that does no[…] from arguments in individuals' preferences.

[…]ations, based on the value definition, provide the basis for deriving […]mates of central tendency (Hanemann, 1984; Cameron, 1988; McCon[…]ell, 1990).

[…] information regarding the change in the likelihood of contamination […]missing from the CV question, respondents guess at the current and […]re likelihoods of contamination, and there is no assurance that all […]pondents will impose the same assumptions (Lindell and Earle, 1983). […]en different respondents impose different assumptions, then, CV […]onses can only be assumed to be loosely associated with the desired […]cy value and aggregating individual CV responses may be akin to adding […]les and oranges, whereas under the best of conditions, perhaps, the […]blem may be no worse than aggregating different varieties of apples. […]e absence of probability information appears to be an act of accidental […]ission in many cases. In some cases, however, CV exercises are not well-[…]ed to physical changes that are occurring in the resource. In the case of […]oundwater contamination, CV studies have been hindered by the absence […] dose-response models that reveal how the policy being valued will affect […]oundwater contamination (Boyle *et al.*, 1994). Thus, physical scientists […] not be providing all of the information needed to effectively apply CV […] estimates to assess specific environmental policy and management […]ons.

[…]e second issue also relates to uncertainty—even if information on the […]ood of contamination is provided in a CV question, respondents may […] this information in favour of their own subjective perceptions of […]mination. In a classic study, Lichtenstein *et al.* (1978) demonstrate […] people tend to overestimate the likelihood of low-probability events […] underestimate the likelihood of higher-probability events (see also Kask […]aani, 1992). If this is the case, providing information on the likelihood […]tamination in the CV question may not be sufficient; it may also be […]ssary to elicit respondents' subjective perceptions of the likelihood of […]mination in the survey. Doing this, however, opens other potentially […]irable doors. Should subjective probabilities be elicited prior or sub-[…]ent to the CV question? The former can be used as exogenous regres-[…] but may not represent those used in answering the CV question if […]tant information is contained in the question itself. Subjective prob-[…]ities elicited immediately subsequent to the CV question may be more […]sentative of the information respondents used in answering the CV […]ion, but this data is endogenous to the valuation exercise. These issues […]not been explored in the CV literature, and if they have been explored […]ial psychologists in other contexts, this literature has not been brought […]r on CV. If respondents employ subjective probabilities when answer-[…] CV questions, the resulting value estimates are only appropriate for […]ing a policy that actually reduces the probability of contamination, for […]ple, by the proportion that respondents subjectively employ. Different

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respondents may employ different subjective probabilities, further comp[illegible] ating the interpretation of CV data unless this issue is explicitly addresse[illegible] the analysis.

Another implication of subjective editing is that CV studies which atte[illegible] to measure values under certainty may actually be measuring values un[illegible] uncertainty—that is, option price. For example, many CV studies [illegible] framed to estimate values under conditions of supply certainty. Howe[illegible] the description of potential effects of a proposed policy in a CV ques[illegible] may not be clear to respondents or respondents may not believe tha[illegible] outcome of the policy will occur with certainty. The consequence is [illegible] respondents may edit the information presented, transforming the CV e[illegible] cise to valuation under uncertainty. Even if supply is certain and the [illegible] description is completely clear, respondents may be providing option p[illegible] if their demand is uncertain. Thus, changes in probabilities, whether obje[illegible] ive or subjective, are fundamental to CV studies and the ramifications of [illegible] theme are relatively unexplored in the CV literature.

The third issue relates to the components of option price. Since op[illegible] price can be interpreted as economic value under uncertainty (Ra[illegible] 1991), it can include both use and non-use values as components [illegible] ongoing debate among researchers and decision-makers is the rel[illegible] importance of these two component values while the interrelationshi[illegible] these components remains unknown (Fisher and Raucher, 1984). Fo[illegible] ample, are use and non-use values complementary or substitutes?

The bottom line is that although option price is perhaps the most w[illegible] estimated value in the CV literature, this value is generally treated [illegible] black box, without concern for the component parts. Such benign ne[illegible] may be acceptable in a policy context where option price is the de[illegible] welfare measure, but this state of affairs is simply unacceptable fro[illegible] research perspective when considering the validity and reliability of [illegible] estimates.

7.3.2. Non-Use Values

This is not the place to debate the validity of non-use values and t[illegible] relevance for public policy (Kopp, 1992); rather, non-use values are acc[illegible] for this discussion and the estimation of these values is considered (Bi[illegible] and Welsh, 1992; Carson *et al.*, Chapter 4 of this volume). We consider [illegible] two main areas of investigation in the literature: alternative CV appro[illegible] for measuring non-use values and explorations of revealed-preference [illegible] niques for measuring non-use values.

With respect to CV approaches for measuring non-use values, one li[illegible] research starts with the estimation of option price, or total value un[illegible] conditions of certainty, and then estimates non-use values conditioned [illegible] the absence of any use opportunities (Boyle and Bishop, 1987). An alt[illegible]

[illegible] approach asks respondents for total values and to allocate their [illegible]onses to a menu of component values, which includes several types of [illegible]se value 'motivations' (altruism, bequest, etc.) (Walsh *et al.*, 1984; [illegible]mis, 1987). The debate over these two approaches has been going on [illegible]ver a decade without any resolution, or any solid research to support [illegible] position.

[illegible] former approach has the advantage that non-use values are condi-[illegible] on a specific set of circumstances—but is this set of circumstances [illegible] for the policy question at hand? If embedding does occur as sug-[illegible] by Kahneman and Knetsch (1992), then this approach may reduce the [illegible]ntial for respondents to provide responses composed of use and non-use [illegible] when only non-use values are requested. If use and non-use values are [illegible]plementary, then non-use values are overestimated if use truly would not [illegible]cluded. The converse occurs if they are substitutes. Conditioning non-[illegible]ues on the absence of use values would be irrelevant if these compo-[illegible] values are neither complements nor substitutes.

[illegible] menu approach avoids having non-use values conditioned on the [illegible] of use values, but has a comparable drawback. Unless value com-[illegible]ts each arise from weakly separable components of individuals' pre-[illegible], the component values will not be additive. If preferences for [illegible]ponent values are not separable, estimates for individual components [illegible]ditioned on the sequence in which the researcher designs the menu of [illegible]. In addition, questions arise regarding whether the components of [illegible]use menu are appropriate or whether respondents are answering the [illegible]tion question in the only way possible given the framing of the response [illegible].

[illegible] recent article, Larson (1993) challenges the conventional wisdom [illegible] CV is the only game in town when it comes to measuring non-use [illegible] and develops a conceptual framework for revealed-preference mea-[illegible] of non-use values. For opponents of CV this makes the method [illegible]lete whereas for proponents it provides an empirical testing-ground [illegible]alidation of non-use value measures. Larson's conceptual framework [illegible] upon such activities as money and time committed to environmental [illegible] as revealed-behaviour linkages to non-use values. While these activ-[illegible] are likely indicators of non-use values, they may also contain a use [illegible]ponent which is difficult to separate out from the non-use component. [illegible]onmental-NGO members, for example, may receive publications to [illegible] and other services which contribute to use values (Portney, 1994). In [illegible]tion, individuals holding non-use values who have not demonstrated [illegible]hoice-based behaviour are omitted.

[illegible]other more general problem exists in much of the non-use value liter-[illegible]—non-use values are not well understood and defined. Misunderstand-[illegible] begin with the label ('non-use', 'existence', 'bequest', and 'passive use') [illegible] carry through to empirical estimates. All that appears to be clearly

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known is that non-use values do not *require* any revealed-preference [illegible] viour or direct interaction with the environmental resource. Beyond [illegible] point the waters become murky rather quickly, precluding progress re[illegible] ing the validation of economic estimates of non-use values using CV or [illegible] other technique. Since explorations of alternatives to CV for measuring [illegible] use values are in their infancy, the spotlight has been on CV as the [illegible] technique for measuring non-use values. Issues surrounding the defini[illegible] measurement, and application of non-use values, however, are much la[illegible] than concerns one might have about CV as an economic valuation te[illegible] nique, but at this time the two (CV and non-use values) appear t[illegible] systemically rather than fraternally connected.

7.3.3. WTP and WTA Disparity

The CV literature has a number of studies demonstrating substantial em[illegible] ical differences between WTP and WTA (Bishop *et al.*, 1983; Knetsch [illegible] Sinden, 1984; Brookshire and Coursey, 1987; Coursey *et al.*, 1987) [illegible] nomic theory suggests that the difference between WTP and WTA shou[illegible] small if income effects are small (Just *et al.*, 1982; Freeman, 1993) or [illegible] substitutes exist for the commodity being valued (Hanemann, 1991). [illegible] ever, even when these conditions appear to be met in empirical stu[illegible] unreasonably large disparities between WTP and WTA have been obse[illegible] Kahneman and Tversky (1984) use 'prospect theory' to suggest that the [illegible] disparities between WTP and WTA might be explained by respond[illegible] shifting reference points when valuing gains and losses of equal magnitu[illegible] At this point, however, the disparity between WTP and WTA observe[illegible] empirical CV studies remains an enigma. Problems with adequately expl[illegible] ing observed disparities between WTP and WTA, and unrealistically [illegible] estimates of WTP relative to WTA, prompted the NOAA Panel to reco[illegible] mend the use of WTP.

In many natural resource and environmental situations, WTA is [illegible] theoretically correct welfare measure (Vatn and Bromley, 1994). [illegible] includes situations, for example, where an individual may suffer the los[illegible] use of a natural resource over which they hold initial rights. In such a [illegible] the correct Hicksian welfare measure is the minimum compensation it wo[illegible] take to bring the individual back up to his or her pre-loss utility level [illegible] *et al.*, 1982; Freeman, 1993). Because of the theoretical relevance of W[illegible] under certain property-right structures, it seems inconsistent simultaneo[illegible] to advocate the use of CV and exclude applications to WTA. For exa[illegible] Coursey *et al.* (1987) found that WTP is stable in repeated trials, while W[illegible] declines over repeated trials and asymptotically approaches WTP. Th[illegible] experimental results, although not directly transferable to CV applicati[illegible] do suggest possible means for reducing the disparity between WTP [illegible] WTA in CV surveys.

7.4. ELICITATION AND ANALYSIS OF CV RESPONSES

[illegible]ection we first discuss issues surrounding the question format used to [illegible] responses. Implicit in the Fischoff and Furby article is the recogni[illegible] the design of CV questions for eliciting values contains two differ[illegible] related, components. The first is the description of the commodity [illegible]alued (commodity description) and the second is the description of [illegible]itutional setting for valuing the commodity (contingent market). [illegible] component stands alone, but each raises separate issues to be [illegible]dered.

7.4.1. Commodity Description

[illegible]mmodity description constitutes the bridge between the theoretical [illegible] of value and respondents' value responses. As such, this is the [illegible] component of any CV study, because it tells respondents what they [illegible]g and flaws in this information can undermine the entire valuation [illegible] The concerns here can be succinctly expressed with three questions. [illegible]formation do respondents need to answer CV questions? What [illegible]ation unduly influences CV responses, i.e. leads respondents to under[illegible] or overstate their values? And is it possible to create information [illegible]ad by providing respondents with an overly detailed commodity [illegible]tion?

[illegible]erring back to the groundwater option price in Equation (7.2), the [illegible]dity description would detail the contaminants and the effects of [illegible]ination. The baseline likelihood of contamination would be pre[illegible] along with its proposed change. The availability and cost of substitute [illegible] of potable water would also be provided, as advocated by the [illegible] Panel. This collective information is what Fischoff and Furby refer [illegible] the 'good'. They state that 'achieving . . . clarity in [the commodity [illegible]ption] . . . is a craft, but one that can be aided by the scientific study [illegible] potential pitfalls' and 'has been part of the research methodology of every [illegible] science that asks people to answer unfamiliar questions' (1988: 154). A [illegible]ber of studies have found the addition or deletion of information in [illegible]modity descriptions can have statistically significant effects on CV [illegible]ses (Bergstrom and Stoll, 1989; Bergstrom *et al.*, 1989, 1990; Boyle, [illegible] Poe, 1993; Munro and Hanley, Chapter 9 of this volume), highlighting [illegible]eed to investigate appropriate commodity descriptions.

[illegible]rgstrom *et al.* (1990) group information used to describe an environ[illegible] commodity under two broad headings, characteristic and service [illegible]mation. Characteristic information describes the objective physical [illegible]butes of an environmental commodity (e.g. groundwater quantity and [illegible]ity). Service information describes how changes in commodity charac[illegible]stics affect use and non-use service flows (e.g. drinking-water services and

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existence value of clean aquifers). This may be less important for the esti[illegible] tion of use than non-use values because users may be relatively more fam[illegible] with the implications of a change in the resource. If users have not exp[illegible] enced the proposed condition of the resource, service information may [illegible] be of primary importance when individuals are answering CV questio[illegible] designed to elicit use values (Boyle *et al.*, 1993).

Identifying appropriate types and amounts of characteristic and ser[illegible] information to describe an environmental commodity adequately is a di[illegible] cult task. Additionally, relevant information is not limited to that regar[illegible] the characteristics and services of the environmental commodity *per se*. [illegible] NOAA Panel, for example, stresses the need to include substitute infor[illegible] tion in a CV survey. But the literature is not clear as to how much substit[illegible] information is 'enough'. In a meta-analysis of CV studies of groundwa[illegible] value (Boyle *et al.*, 1994), information regarding the cost of substitu[illegible] significantly reduced WTP responses while information about substit[illegible] availability did not. Cummings *et al.* (1994) have also shown that the pro[illegible] sion of information on substitutes can influence values in a laborato[illegible] setting. Considering the research agenda, particularly in the context [illegible] field experiments, addressing substitutes is not easy. If CV estimates [illegible] not statistically sensitive to information on substitutes, a number of pl[illegible] ible explanations arise: respondents neglected to consider substitutes so [illegible] CV estimates are flawed, likely overestimating the true value; the investi[illegible] tor provided the wrong set of substitutes so the study design is flawed; [illegible] respondents were already considering substitutes so the provision of [illegible] information in the CV experiment was redundant.[3]

The NOAA Panel proposed a 'burden of proof' test where, in the abs[illegible] 'of reliable reference surveys, ... pretesting and other experiments', pra[illegible] tioners must show that each CV 'survey does not suffer from the proble[illegible] that their guidelines are intended to avoid' (1993: 4614). As the exampl[illegible] the preceding paragraph illustrates, the burden of proof can constitu[illegible] formidable obstacle. Statistical results, whether from a CV study or a st[illegible] using market data, can be subject to multiple interpretations and identif[illegible] appropriate conclusions can often be difficult at best. The correct se[illegible] substitutes may vary across goods and sample populations, makin[illegible] difficult to establish a set of reference surveys. These concerns ar[illegible] unique to substitutes, but may be pervasive throughout commodity de[illegible] tions.

Ferreting out an appropriate commodity description has generally [illegible] based on the issue to be valued, discussions with individuals knowledg[illegible] with the valuation issue, the theoretical definition of value, previous stu[illegible] of similar topics, and the investigators' experience. This is where the [illegible]

[3] It is assumed that the CV experiment would have a design where respondents [illegible] be randomly stratified into those who do, and those who do not, receive informat[illegible] substitutes.

[illegible]schoff and Furby discuss plays a crucial role in the design process. [illegible]ing the survey instrument typically involves the use of focus groups, [illegible]-one pre-tests, and more recently verbal protocols allowing the survey [illegible]ment to be tailored to the specific application (Desvousges *et al.*, 1992; [illegible]land *et al.*, 1993).

[illegible] criticism of such an individualized, interactive approach to survey [illegible] is that information provision may become endogenous to the survey [illegible]ss. How does this repeated interaction affect the researchers' percep[illegible] of the valuation problem (e.g. does the nature of the commodity to be [illegible] change)? Furthermore, the iterative nature of such an approach [illegible] the CV researchers to decide, on an *ad hoc* basis, to add or drop [illegible]mation based on insights gained from focus groups, pre-tests, etc. If [illegible]tical tests are not conducted to investigate the effects of adding or [illegible]ing information, how do we know what the final effects of such changes [illegible] on CV responses?

[illegible]mply put, we do not know what information respondents need, so [illegible]mation provision often appears to be a hit-or-miss attempt to provide [illegible]ate and complete information, perhaps subject to the whims of indi[illegible] investigators. In addition, commodity descriptions are often con[illegible]ned by the availability of technical details regarding proposed changes [illegible]rovision. Progress demands a systematic research programme to identify [illegible]classify the specific types of information respondents commonly use [illegible] answering CV questions and how this varies across applications and/or [illegible]ndents. Furthermore, such a research process must be conducted in an [illegible]disciplinary context to improve the technical information that often [illegible]tutes the basis of commodity descriptions.

7.4.2. Contingent Market or Referendum Description

[illegible] issues are explored in this subsection: (1) choice of CV question format; [illegible] selection of a payment vehicle; (3) treatment of zero, protest, and mis[illegible] bids; and (4) mode of data collection. The NOAA Panel's recom[illegible]dation of referendum questions provides an underlying linkage of these [illegible]. Referendum questions are dichotomous-choice questions with the [illegible]ent vehicle posed as a referendum vote.

[illegible] *Dichotomous-Choice Questions*

[illegible]mber of different formats have been used to frame CV questions, with [illegible]otomous-choice, open-ended, and unanchored payment cards being [illegible] commonly employed in the literature today (for more discussion of [illegible] question formats, see Langford and Bateman, Chapter 12 of this [illegible]me). The most important questions, however, centre on dichotomous-[illegible] (DC) questions. A generic DC question, given a commodity descrip[illegible] and appropriate payment vehicle, might be posed as:

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> Would you pay $—— per year to reduce groundwater contamina[illegible] so drinking water meets US Environmental Protection Agency sa[illegible] standards?

The blank is filled in with a randomly assigned monetary amount (Co[illegible] 1993). This question can be modified to a referendum format:

> Would you vote 'yes' on a referendum to reduce groundwater contam[illegible] tion so drinking water meets US Environmental Protection Agency sa[illegible] standards and your personal cost would be $——?

The referendum format has been advocated by Hoehn and Randall (1[illegible] using incentive-compatibility arguments. The referendum format is no[illegible] versally applicable. Mitchell and Carson (1989) have argued that pay[illegible] vehicles must be believable and neutral in the elicitation of values[illegible] referendum framing of DC questions is not likely to satisfy the believab[illegible] condition in the elicitation of many use values because referenda ar[illegible] typically used to make money from these decisions. Thus, althoug[illegible] questions are universally applicable, the referendum format is only ap[illegible] able in narrower contexts.

The primary concern with DC questions is whether the monetary am[illegible] provides a value clue, thereby inadvertently affecting responses. Coope[illegible] Loomis (1992) provide tentative evidence of these effects, and Shapiro [illegible] has shown that this type of anchoring can arise even with the a[illegible] individuals pay for market goods. These effects can occur for tradi[illegible] DC questions or for DC questions posed as a referendum, and may b[illegible] pronounced with multiple-bounded DC questions (McFadden, 1994[illegible] tentative evidence on anchoring proves to true, will DC maintain its [illegible] status as the fair-haired CV question format?

The anchoring concern in DC questions, however, is a prime examp[illegible] the issue of relative errors discussed in the Introduction. If posting a pr[illegible] a market good can influence what consumers will pay for a market goo[illegible] influence would be reflected in Marshallian estimates of consumer surp[illegible] the anchoring effect in DC questions any worse than for market goo[illegible] posted prices? Within this context, a statistically significant anchorin[illegible] is not sufficient to dismiss DC questions, but it is necessary to ass[illegible] extent of this impact relative to any similar effect in revealed-beh[illegible] measures. Future research on CV questions should focus on the se[illegible] and effect of monetary amounts in DC questions, and the relative er[illegible] value estimates derived from DC questions versus competing questio[illegible] mats (open-ended and unanchored payment cards).

7.4.2.2. *Payment Vehicle*

Despite early evidence that payment vehicles can influence responses [illegible] questions (Rowe and Chestnut, 1983; Mitchell and Carson, 1985) n[illegible]

[illegible] research has been conducted to address this concern. The guiding [illegible]ciple has been the Mitchell and Carson (1989) believability and neutral-[illegible]onditions, and with the extensive use of DC questions, the Hoehn and [illegible]dall (1987) incentive-compatibility argument is often invoked. In reality, [illegible]ment vehicles are generally customized to each study and are refined in [illegible]ey pre-testing, with no checks for undesirable effects of the payment [illegible]cle on value estimates. The selection of payment vehicles would not pass [illegible] NOAA Panel's 'burden of proof' test of content validity (Carmines and [illegible] 1979), leaving a large hole in the CV literature.

[illegible]en DC questions posed as referenda are not without problems. The first [illegible] 'DC' and 'referendum' are often used as synonyms to describe CV [illegible]tions eliciting a yes/no response to a fixed monetary amount. This [illegible]sion has led some investigators to pose DC questions that do not use [illegible]erendum, while appealing to the Hoehn and Randall incentive-compat-[illegible] argument. As noted above, the referendum format does not always [illegible] the Mitchell and Carson believability condition for some applications [illegible] DC questions. Finally, and most important, the institutional context of [illegible]quires that respondents know how the payments will be collected. The [illegible]ndum format must include an explanation of how the payments will be [illegible]cted, e.g. per household fee on water bills, property taxes, income tax, [illegible] This brings us full circle to the conditions where payment vehicle effects [illegible]itially identified. The referendum format of DC questions may have [illegible]ble incentive properties for eliciting values, but the inclusion of a [illegible]ent mechanism may have concurrent undesirable effects. The effects [illegible]yment vehicles simply can not continue to be overlooked from either a [illegible]ptual nor an empirical perspective.

[illegible] *Zero, Protest, and Misstated Responses*

[illegible] are not issues that have been neglected in the CV literature, but they [illegible] from being resolved. Given the discussion above, the initial focus here [illegible] DC questions. 'No' responses to DC questions are generally probed [illegible]valid responses, searching for free-riders, individuals protesting about [illegible]yment vehicle, etc. If the data are to be screened for invalid responses, [illegible]sponses must also be examined, for example, to identify individuals [illegible]upport the project behaving strategically. Beyond this consistency in [illegible]atment of the data, no established theoretical criteria or generally [illegible]ed protocols exist for excluding observations from data analyses. It [illegible]s that a consensus exists that some observations may be invalid, but [illegible]lusion of observations is generally undertaken using *ad hoc* criteria.

[illegible] NOAA Panel recommended allowing respondents the option of [illegible]ing 'do not know' in addition to 'yes'/'no' when answering DC ques-[illegible] An additional issue relates to individuals who do not value the good. [illegible]iduals who answer 'no', but hold a positive value, are treated the same [illegible]dividuals who answer 'no' and hold a value of $0. Consideration of

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response distributions to other question formats, such as open-ended questions, suggests that a discrete spike might occur at $0 in the distribution of values. Perhaps individuals who answer 'no' to a DC question should be given the opportunity to answer '$0' and these responses should be modelled in the data analyses.

Concerns regarding data screening also apply to open-ended, unanchored payment cards, and other questioning formats. Open-ended questions typically result in zero bids and these bids are screened for protests and other types of invalid responses. Non-zero bids are also sometimes screened for invalid responses (e.g. a bid representing 25 per cent or more of someone's income might be interpreted as unreasonable or an error). Some investigators have used statistical routines to search for data outliers (Desvousges *et al.*, 1987). The fundamental concern remains; no established theoretical criteria or established protocols exist for excluding responses. Although the issue of zero values does not arise with most other question formats because an answer of '$0' is allowed, the NOAA Panel's concern of allowing 'do not know' responses applies to all questioning formats.

The issue of screening CV data for invalid responses cuts to the heart of the critique that CV is not based on actual consumers' actual market decisions (Diamond and Hausman, 1994). CV practitioners, by screening CV data, implicitly acknowledge that there is some merit to this critique (Stevens *et al.*, 1994). The implicit agreement does not extend beyond this initial acknowledgement. Critics appear to be arguing that the absence of cash transactions makes all CV responses flawed or that the share of invalid responses in the data makes it useless for statistical analyses. CV practitioners appear to believe that the share of individuals providing invalid CV responses is small and these responses can be identified and addressed in data analyses. This process is not easy. Why would someone who is behaving strategically reveal this motive to an interviewer? If direct revelation of ulterior motives is not possible, is there an objective way to identify strategic responses?

These concerns also apply to accidental misstatements of value when, for example, a respondent does not fully understand the valuation task. Respondents' misunderstandings of CV scenarios, from either incomplete or unclear commodity descriptions, may be the key reason for the embedding problem, which is on the 'front burner' in the current debate over the application of CV to measuring non-use values (Diamond and Hausman, 1994; Hanemann, 1994).

It is not an easy task to establish conditions for excluding responses from CV data. A profitable line of investigation, perhaps, involves identifying groups of individuals who are likely to misstate their values either purposely or inadvertently. The focus would be on whether responses by these individuals significantly influence estimated statistics. This is not substantially different to what some investigators have done when they use the data with

and without invalid responses, but the investigations could be more focused in terms of economic theory and more rigorous in terms of statistical analyses. Researchers should investigate the appropriateness of the NOAA Panel's 'do not know' recommendation. This issue was already being investigated prior to the NOAA recommendation (Ready *et al.*, 1995). Zero-bidders in DC data also need to be investigated, as do other influential observations such as 'outliers' (Mitchell and Carson, 1989).

As a matter of perspective, it is important to recognize that screening of data occurs in all empirical analyses, even market data. For example, the US Department of Agriculture's Market News Service collects data on the sale prices and volumes of agricultural commodities. Data reported by sellers and buyers that is deemed to be misstated in an attempt to influence market conditions is excluded from reported market statistics.[4] The exclusion decision is made by the individual who collects the market data and the individual's superior; no explicit theory or econometric analyses are used as a basis for exclusion. Some valid data may be excluded and some invalid data may be included. It is also important to recognize that individuals operating in wholesale markets might have more knowledge, ability, and incentives to influence survey outcomes than do respondents to CV surveys. Market data, like CV data, are often collected in a survey format, with all of the associated data-collection problems and with a greater likelihood of respondents behaving strategically. Again, we are back to the issue of relative errors.

7.4.3.4. *Mode of Data Collection*

The NOAA Panel's recommendation of personal interviews, and its statement that they believe that it is unlikely that reliable estimates of values could be elicited with mail surveys' (1993: 4608), hit a raw nerve among CV researchers and survey researchers who work with mail surveys. This is an example where a strong position has been taken without adequate reference to the literature. What is known in the literature on personal interviews and mail surveys that supports the NOAA Panel's position? Using personal interviewers allows an investigator more control over respondents' CV responses, but also introduces a potential interviewer effect. How should these countervailing effects be considered?

The vast majority of CV studies have been conducted using mail surveys because the per-observation cost is less than that of personal interview surveys and most university researchers do not have access to trained interviewers. These pragmatic considerations, however, are not sufficient to justify the extensive use of mail surveys; it must be demonstrated that mail surveys are capable of providing valid and reliable CV estimates. There are only a few studies in the literature that investigate alternative

[4] This information was received from Mr John Boyle (Kevin Boyle's father), who is a former employee of the Market New Service.

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CV administrative modes, and these studies produce mixed or inconclusive results (Randall and Kriesel, 1990; Mannesto and Loomis, 1991; Loomis and King, 1994). Because of the dearth of research investigating the relative merits of different modes of administrating CV surveys, we believe this issue deserves high priority on the CV research agenda. With personal interviews being the most expensive form of primary-data collection, the benefits of establishing mail surveys as a credible mode for conducting CV surveys can be substantial.

7.4.4. Analysis of CV Responses

Many contributions have been made to the CV literature in recent years in terms of analysing DC data (Cameron, 1988), functional form of valuation equations (Boyle, 1990), developing bid amounts for DC questions (Cooper, 1993), computing confidence intervals for DC means (Park *et al.*, 1991)—and the list goes on and on. Looking at the future research agenda, contributions in this area might be reaching diminishing returns. Sophisticated econometric models are intended primarily to recover information from poor data. Many of the recent contributions to the CV literature accept the quality of whatever data is available and concentrate on new econometric twists to develop what may be questionable insights. However, the greatest future pay-offs may lie in two areas: (1) better understanding of individual preferences for environmental commodities, with insights from a wide variety of disciplines including economics, psychology, marketing, and philosophy (Portney, 1994), and (2) improving CV data-collection efforts to enable clearer and more robust insights from empirical analyses of these data.

7.5. CONCLUSIONS

The title of this chapter was posed as a question, so it is only appropriate to answer the question. The answer is implicit in the arguments presented within the chapter. The current debate surrounding CV has changed the rules of the game, suggesting the need for a more focused research agenda and improved study designs leading to clearer insights. This conclusion is emphasized by the NOAA Panel's 'burden of proof' condition. Rather than CV being innocent until proven guilty, the lasting impact of the Panel may be their judgement that CV estimates are guilty until proven innocent. Although the context for their pronouncement dealt with CV applications to non-use values in natural-resource damage litigation, it is clear that their guide-lines are being generally applied to all applications of CV. The loosely evolving nature of CV research and the lack of a revealed-preference connection for non-use values made the application of CV to the measurement of non-use values susceptible to criticism.

The basic argument against CV, that transactions involving cash do not occur, comes very close to rejecting the sovereignty of consumer demand in suggesting that consumers cannot decide what is in their best interest unless money changes hands. This seems to be a relatively strict and arbitrary condition. In fact, if CV did not exist, Exxon would have looked for another weak link to reduce their potential liability payment, even if the only opportunities were revealed-preference measurements. Thus, the issue that brought CV to its current contentious position might have focused on a revealed-preference measure within another context.

Hard-and-fast positions on any issue appear to shut off the research agenda prematurely. Research is about asking hard questions and subjecting these questions to objective and rigorous study. Researchers are trained to raise doubts and act as if we were all from Missouri—that is, before we reject or accept something as 'fact', we say, 'Show me!' A healthy dose of scepticism is important in the application, use, and interpretation of any empirical methodology. However, any empirical methodology, whether it deals with estimating economic values or testing an accused criminal's DNA, cannot be rejected out of hand by unsubstantiated doubt and scepticism.

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8
A Psychological Perspective

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8.1. INTRODUCTION

From the perspective of psychology, any social survey should be seen first as an experiment to test one or more hypotheses derived from some theory. In general, psychology does not accept the axiomatic claim made for the assumptions upon which the neo-classical economic model is built. It also sees people as more fallible and complex than is assumed in neo-classical economics. Secondly, psychology differs in its model of the person. The neo-classical model is essentially static: an individual has both pre-existing preferences and perfect information. Conversely, the psychological model is a process model where the emphasis is upon how beliefs and preferences are formed or learnt, and how information is acquired. Thirdly, an interview, like any form of interpersonal communication, is regarded as fraught with the potential for misunderstanding, misdirection, mistakes, and incomprehension. Instead of having the economist's concerns for strategic bias and incentive-compatibility, the psychologist worries about whether the task asked of the respondent is one which they can do and about the likelihood that the respondent will give the answer that they feel they ought to give: socially acceptable responses or answers that others (interviewer, experimenter, sponsor, or others present) want to hear. These potential respondent effects we shall refer to as 'compliance bias' (Groves *et al.*, 1992), using this term in a somewhat broader definition than that adopted by Mitchell and Carson (1989). Fourthly, in psychology an experiment is increasingly defined as a form of discourse, an interaction between several groups of people (Figure 8.1) in which the respondent has demands and has demands placed upon him or her by the experimenter. Thus, whilst much of psychology shares with economics a focus on the behaviour of the individual in isolation, social psychology treats individual behaviour as emerging from the individual's interaction in a social context.

The task, from the psychological perspective, of the experimenter in developing a contingent valuation (CV) study, and it is here assumed that the study will involve interviews carried out face to face, as recommended by

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